



COMMERCIAL

PAS

Product Specifications

STANDARD EFFICIENCY PACKAGE A/C UNIT - 174 to 216 MBtuh

REFRIGERATION CIRCUIT

- All models are equipped with high efficiency scroll compressor on each circuit.
- Dual, electrically and mechanically independent circuits.
- Refrigerant filter drier and evaporator freeze thermostat
- High and Low pressure switches for excellent compressor protection.

BUILT TO LAST

- Pre-painted galvanized steel cabinet for long life and quality appearance.
- Commercial strength base rails with built-in rigging capability.
- Non-corrosive, sloped condensate drain pan, meets ASHRAE 62-89.

EASY TO INSTALL AND SERVICE

- Electric cooling, self contained for year-round comfort. Unit shipped ready for downflow applications with conversion to horizontal airflow accomplished with accessory horizontal discharge roof curb.
- Thru-the-base utility connections.
- 25% Manual outside air damper.

WARRANTY

- 5 Year compressor limited warranty
- 1 Year parts limited warranty



UNIT PERFORMANCE DATA

Model Number *	COOLING			Unit Dimensions H X W X L	Unit Weight
	Rated Capacity BTUH	E.E.R	IPLV		
PAS180H000A	174,000	8.8	9.2	45" x 86-1/8" x 87-3/8"	1500
PAS180L000A	174,000	8.8	9.2	45" x 86-1/8" x 87-3/8"	1500
PAS180S000A	174,000	8.8	9.2	45" x 86-1/8" x 87-3/8"	1500
PAS210H000A	188,000	8.8	9.8	45" x 86-1/8" x 87-3/8"	1650
PAS210L000A	188,000	8.8	9.8	45" x 86-1/8" x 87-3/8"	1650
PAS210S000A	188,000	8.8	9.8	45" x 86-1/8" x 87-3/8"	1650
PAS240H000A	216,000	8.6	8.4	47-1/4" x 86-1/8" x 87-3/8"	1750
PAS240L000A	216,000	8.6	8.4	47-1/4" x 86-1/8" x 87-3/8"	1750
PAS240S000A	216,000	8.6	8.4	47-1/4" x 86-1/8" x 87-3/8"	1750

* Unit voltage: H = 208/230v, L = 460v, S = 575v

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Table of Contents

	Page
Features/Benefits	1
Model Number Nomenclature	2
Unit Specifications	3-5
Dimensions	6-7
Performance Data	8-12
Typical Installations	13
Accessories	14-18
Operating Sequence	19
Application Data	19
Guide Specifications	19

MODEL NUMBER IDENTIFICATION GUIDE							
MODEL NUMBER	P	A	S	180	H	000	A
PRODUCT FAMILY Package Units							Sales Code
TYPE H= Heat Pump G = Gas/Electric A = Air Conditioner							OPTIONS
DESIGN SERIES							VOLTAGE / PHASE / HERTZ H = 208/230-3-60 ... L = 460-3-60 S = 575-3-60
							COOLING CAPACITY (NOMINAL BTUH) 180 = 15 Ton 210 = 17-1/2 Ton 240 = 20 Ton

UNIT SPECIFICATIONS - MODELS						
COOLING	PAS180H	PAS180L	PAS180S	PAS210H	PAS210L	PAS210S
ARI Rated Capacity Btuh (Net)	174,000			216,000		
Nominal Tons	15			17-1/2		
Standard CFM	5250			6600		
EER	8.8			8.8		
IPLV	9.2			9.8		
Sound Rating (Bels)	8.8			8.8		
Base Unit Operating Weights (lbs)	1500			1650		
ELECTRICAL						
Volts/ 3 Phase/ 60Hertz	208/230	460	575	208/230	460	575
Voltage Range Min/Max	187 / 253	414 / 508	518 / 632	187 / 253	414 / 508	518 / 632
Power Supply MCA	73.2 / 73.7	37.6	29.1	85 / 85	41	33
Power Supply MOCP*	90 / 90	50	35	110 / 110	50	45
COMPRESSOR						
SCROLL						
Quantity...Model	(2)...SR*942AE			(1)...SM120 / (1)...SR*782AE		
No. of Circuits	2			2		
RLA / LRA	Circuit #1	25.6 / 190	13.5 / 95	10.2 / 75	33.0 / 237	16.2 / 130
	Circuit #2	25.6 / 190	13.5 / 95	10.2 / 75	23.0 / 184	10.2 / 90
Oil (Oz.) per circuit	90, 90			110, 72		
REFRIGERATION TYPE						
R-22						
Expansion Device	TXV			TXV		
Operating Charge (lb. oz.) **	CKT 1 = 10-13 CKT 2 = 10-5			CKT 1 = 15-2 CKT 2 = 11-5		
CONDENSER FAN						
Propeller Type						
Nominal CFM	10,400			9300		
Quantity..Diameter (in.)	3...22			3...22		
Motor Hp...RPM (each)	1/2...1050			1/2...1050		
Watts Input (Total)	1100			1100		
FLA	1.7	0.8	0.75	1.7	0.8	0.75
CONDENSER COIL						
Cross Hatched 3/8 in. Copper Tubes, Aluminum Lanced						
Rows...Fin/In.	2...17			3...15		
Total Face Area (Sq. Ft.)	21.7			21.7		
EVAPORATOR COIL						
Cross Hatch 3/8 in. Copper Tubes, Aluminum Lanced, Face Split						
Rows...Fins/Inche	2...17			3...15		
Total Face Aea (sq. ft.)	17.5			17.5		
EVAPORATOR FAN						
Centrifugal Type						
Quantity...Size (in.)	2...10 x 10		2...10 x 10	2...12 x 12		
Type Drive	Belt		Belt	Belt		
Nominal CFM	6000		6000	7200		
Motor Hp, RPM, Max. Continuous Bhp	3.7, 1725, 4.25	3.7, 1725, 4.25	3.0, 1725, 3.45	5, 1745, 5.9	5, 1745, 5.9	5, 1745, 5.9
FLA (Each)	10.5 / 11.0	4.8	3.9	15.8 / 15.8	7.9	6.0
Motor Frame Size	56H		56H	184T		
Fan RPM Range	891 - 1179		1159 - 1429	910 - 1095		
Motor Bearing	Ball		Ball	Ball		
Maximum Allowable RPM	1550		1550	1550		
Motor Pulley Pitch / Diameter Min/Max. (in.)	3.1-4.1		4.3-5.3	4.9-5.9		
Motor Shaft Diameter (in.)	7/8		7/8	1-1/8		
Fan Pulley Pitch Diam (in)	6.0		6.4	9.4		
Belt, Quantity...Type... Length (in.)	1.BX.42		1.BX.45	1.BX.50		
Pulley Center Line Distance (in)	13.5-15.5		13.5-15.5	13.3-14.8		
Speed Change per Full Turn of Movable Pulley Flange (RPM)	48		44	37		
Pulley Max. full Turns From Closed Postion	5		5	5		
Factory Setting	3.5		3.5	3.5		
Factory Speed Setting RPM	1035		1296	1002		
Fan Shaft Diam. at Pulley	1-3/16		1-3/16	1-7/16		
SEE LEGENDS AND NOTES ON FOLLOWING PAGES						

UNIT SPECIFICATIONS - MODELS				
COOLING		PAS240H	PAS240L	PAS240S
ARI Rated Capacity Btuh (Net)		216,000		
Nominal Tons		20		
Standard CFM		6600		
EER		8.6		
IPLV		8.4		
Sound Rating (Bels)		9.5		
Base Unit Operating Weights (lbs)		1775		
ELECTRICAL				
Volts/ 3 Phase/ 60Hertz		208/230	460	575
Voltage Range Min/Max		187 / 253	414 / 508	518 / 632
Power Supply MCA		109 / 109	54	44
Power Supply MOCP*		125 / 125	70	50
COMPRESSOR		SCROLL		
Quantity...Model		(1)...SM120 / (1)...SM110		
No. of Circuits		2		
RLA / LRA	Circuit #1	33.0 / 237	16.2 / 130	12.7 / 85
	Circuit #2	29.5 / 237	14.1 / 130	11.3 / 85
Oil (Oz.) per circuit		110, 110		
REFRIGERATION TYPE		R-22		
Expansion Device		TXV		
Operating Charge (lb. oz.) **		CKT 1 = 16-3 CKT 2 = 13-8		
CONDENSER FAN		Propeller Type		
Nominal CFM		13,650		
Quantity..Diameter (in.)		2...30		
Motor Hp...RPM (each)		1...1075		
Watts Input (Total)		3400		
FLA		6.6	3.3	3.4
CONDENSER COIL		Cross Hatched 3/8 in. Copper Tubes, Aluminum Lanced		
Rows...Fin/In.		3...15		
Total Face Area (Sq. Ft..)		21.7		
EVAPORATOR COIL		Cross Hatch 3/8 in. Copper Tubes, Aluminum Lanced, Face Split		
Rows...Fins/Inche		3...15		
Total Face Aea (sq. ft.)		17.5		
EVAPORATOR FAN		Centrifugal Type		
Quantity...Size (in.)		2...12 x 12		
Type Drive		Belt		
Nominal CFM		8000		
Motor Hp, RPM, Max. Continuous Bhp		7.5, 1745, 8.7	7.5, 1745, 9.5	7.5, 1745, 8.7
FLA (Each)		25.0 / 25.0	13.0	10.0
Motor Frame Size		213T		
Fan RPM Range		1002-1225		
Motor Bearing		Ball		
Maximum Allowable RPM		1550		
Motor Pulley Pitch / Diameter Min/Max. (in.)		5.4-6.6		
Motor Shaft Diameter (in.)		1-3/8		
Fan Pulley Pitch Diam (in)		9.4		
Belt, Quantity...Type... Length (in.)		1.BX.54		
Pulley Center Line Distance (in)		14.6-15.4		
Speed Change per Full Turn of Movable Pulley Flange (RPM)		37		
Pulley Max. full Turns From Closed Postion		5		
Factory Setting		3.5		
Factory Speed Setting RPM		1120		
Fan Shaft Diam. at Pulley		1-7/16		
SEE LEGENDS AND NOTES ON FOLLOWING PAGES				

UNIT SPECIFICATIONS (CONT)	MODELS		
	PAS180	PAS210	PAS240
HIGH-PRESSURE SWITCH (psig)			
Internal Relief (Differential) Cutout	426	426	426
Reset (Auto.)	320	320	320
LOSS-OF-CHARGE SWITCH (psig) (LOW-PRESS.)			
Cutout	27	27	27
Reset (Auto.)	44	44	44
FREEZE PROTECTION THERMOSTAT (F)			
Opens	30 +/- 5	30 +/- 5	30 +/- 5
Closes	45 +/- 5	45 +/- 5	45 +/- 5
RETURN-AIR FILTERS (THROWAWAY)			
Quantity...Size (in.)	4...20 x 20 x 2	4...20 x 20 x 2	4...20 x 20 x 2
	4...16 x 20 x 2	4...16 x 20 x 2	4...16 x 20 x 2

LEGENDS AND NOTES

LEGEND

Bhp = Brake Horsepower

TXV = Thermostatic Expansion Valve

Bels - Sound Levels

EER - Energy Efficiency Ratio

IPLV - Integrated Part Load Values

MCA - Minimum Circuit Amps

MOCP - Maximum Over-current Protection

FLA - Full Load Amps

LRA - Locked Rotor Amps

RLA - Rated Load Amps

* - Fuse or HACR circuit breaker

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the over-current protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.

2. Unbalanced 3-Phase Supply Voltage

Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent voltage imbalance.

% Voltage Imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

NOTES: 1. Rated in accordance with ARI Standards 210/240, latest revision (for sizes 090 & 120) or 360, latest revision (for size 150).

2. ARI ratings are net values, reflecting the effects of circulating fan heat.

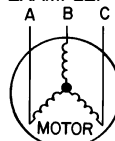
3. Ratings are based on:

Cooling Standard: 80F db, 67F wb indoor entering air temperature and 95F db air entering outdoor unit.

IPLV Standard: 80F db, 67F wb indoor entering air temperature and 80F db entering air temperature.

EXAMPLE: Supply voltage is 460-3-60.

$$\begin{array}{lcl} \text{A} & \text{B} & \text{C} \\ \text{AB} = 452 \text{ v} & \text{Average Voltage} = & \frac{452 + 464 + 455}{3} \\ \text{BC} = 464 \text{ v} & & = \frac{1371}{3} \\ \text{AC} = 455 \text{ v} & & = 457 \end{array}$$



Determine maximum deviation from average voltage.

$$(\text{AB}) 457 - 452 = 5 \text{ V}$$

$$(\text{BC}) 464 - 457 = 7 \text{ V}$$

$$(\text{AB}) 457 - 455 = 2 \text{ V}$$

Maximum deviation is 7 v.

Determine percent voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457} = 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

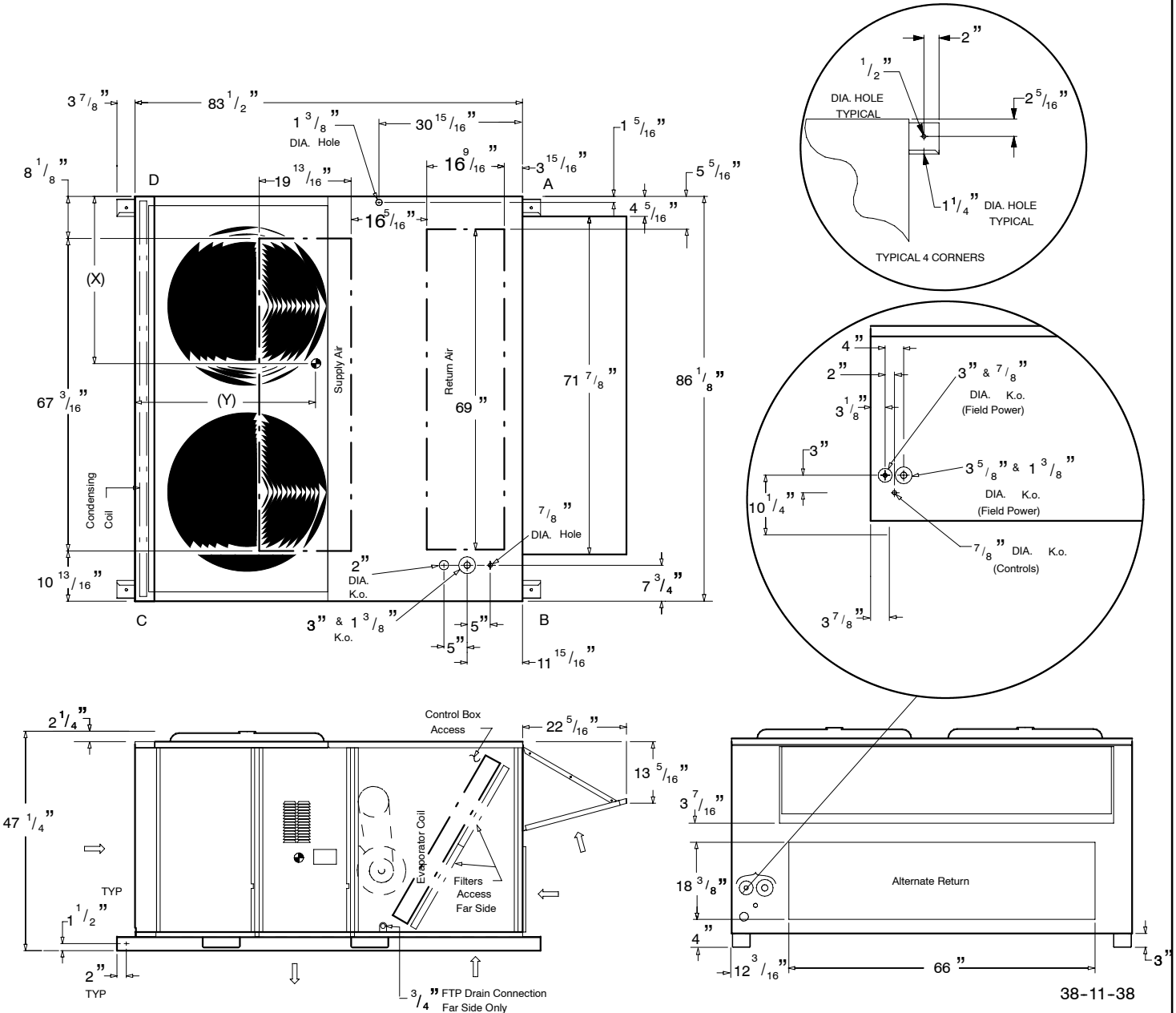
Unit	Total Weight		Corner A		Corner B		Corner C		Corner D		Dim X		Dim Y	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	inches	mm	inches	mm
PAS180	1500	680	374	170	377	171	375	170	375	170	43	1096	42	1054
PAS210	1650	748	380	172	403	183	437	198	405	184	45	1147	40	1006

BASE UNIT DIMENSIONS - PAS240

Unit	Total Weight		Corner A		Corner B		Corner C		Corner D		Dim X		Dim Y	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	inches	mm	inches	mm
PAS240	1775	805	412	187	416	189	468	212	479	217	43	1090	39	989

NOTES:

- Dimensions in () are in millimeters.
-  Center of Gravity.
-  Direction of Airflow
- Ductwork to be attached to accessory roof curb only.
- Minimum clearance:
Rear: 84" (2134) for coil removal. This dimension can be reduced to 48" (1219) if conditions permit coil removal from the top.
Left side: 48" (1219) for proper condenser coil airflow.
Front: 48" (1219) for control box access.
Right Side: 48" (1219) for proper operation of damper and power exhaust if so equipped.
Top: 72" (1829) to assure proper condenser fan operation.
Local Codes jurisdiction may prevail.
- With the exception of clearance for the condenser coil and the damper/power exhaust as stated in Note #5, a removeable fence or barricade requires no clearance.
- Dimensions are from outside of corner post. Allow 0-5/16" (8) on each side for top cover drip edge.



EXPANDED PERFORMANCE DATA (COOLING) 15 Ton (Gross Capacity)

Airflow			Outdoor Ambient Temperature - Degrees F, Dry Bulb														
			75			85			95			105			115		
			Entering Indoor Air Temperature - Degrees F, Wet Bulb														
IDB	CFM (BF)		62	67	72	62	67	72	62	67	72	62	67	72	62	67	72
80	6750 (0.28)	MBU	183	203	221	183	196	213	177	189	205	171	181	197	165	173	188
		S/T	0.88	0.70	0.52	0.88	0.71	0.53	0.89	0.72	0.54	0.89	0.73	0.55	0.88	0.75	0.55
		kW	12.8	13.2	13.5	14.3	14.7	15.1	15.9	16.2	16.6	17.5	17.9	18.3	19.3	19.6	20.1
	6000 (0.25)	MBU	185	200	218	179	193	210	173	186	203	167	179	194	160	171	186
		S/T	0.86	0.68	0.51	0.87	0.69	0.52	0.88	0.70	0.52	0.88	0.71	0.54	0.89	0.73	0.54
		kW	12.8	13.1	13.5	14.2	14.6	15.0	15.8	16.1	16.6	17.4	17.8	18.2	19.1	19.6	20.0
	5250 (0.23)	MBU	182	197	214	175	190	207	169	183	199	162	176	191	156	168	183
		S/T	0.83	0.66	0.55	0.85	0.67	0.51	0.86	0.68	0.51	0.88	0.69	0.52	0.88	0.70	0.52
		kW	12.7	13.1	13.4	14.1	14.5	14.9	15.7	16.0	16.5	17.2	17.7	18.1	19.0	19.5	19.9

FORMULAS AND NOTES FOR USING EXPANDED PERFORMANCE DATA

To find leaving wet bulb and dry bulb from the expanded performance charts, use the following formulas.

1. Direct interpolation is permissible. Do not extrapolate.

2. The following formulas may be used:

$$t/db = t\ edb - \text{sensible capacity Btuh} / (1.10 \times \text{cfm})$$

$$t/wb = \text{Wet bulb temp. corresponding to enthalpy of air leaving evaporator coil (h/wb)}$$

$$h/wb = h\ ewb - \text{total capacity Btuh} / (4.5 \times \text{cfm})$$

where h ewb = Enthalpy of air entering evap. coil

3. The SHC is based on 80F edb of air entering evap coil.
Below 80F edb, subtract (corr factor x cfm) from SHC.
Above 80F edb, add (corr factor x cfm) to SHC.

LEGEND

MBH = Total Capacity (Gross)
S/T = Sensible to Total Ratio
KW = Compressor Motor Power Input.
IDB = Indoor Dry Bulb
edb = Entering Dry Bulb
ewb = Entering Wet Bulb
t/db = Leaving Dry Bulb
t/wb = Leaving Wet Bulb
h/wb = Enthalpy of Leaving Wet Bulb
SHC = Sensible Heat Capacity

Bypass Factor (BF)	Entering Air Dry-Bulb (F)				
	79	78	77	76	75
	81	82	83	84	85
Correction Factor					
0.05	1.04	2.07	3.11	4.14	5.18
0.10	0.98	1.96	2.94	3.92	4.91
0.20	0.87	1.74	2.62	3.49	4.36
0.30	0.76	1.53	2.29	3.05	3.82
0.40	0.65	1.31	1.96	2.62	3.27
0.50	0.55	1.09	1.64	2.18	2.73
0.60	0.44	0.87	1.31	1.74	2.18
0.70	0.33	0.65	0.98	1.31	1.64

$$\text{Correction Factor} = 1.10 \times (1 - \text{BF}) \times (\text{edb} - 80)$$

EXPANDED PERFORMANCE DATA (COOLING) 17-1/2 Ton (Gross Capacity)

Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm													
		5400							6000						
		Evaporator Air — Ewb (F)/BF													
		54/0.49	58/0.31	62/0.20	67/0.18	72/0.16	76/0.19	80/0.05	54/0.53	58/0.35	62/0.23	67/0.19	72/0.17	76/0.19	80/0.05
75	TC SHC kW	194	198	206	223	243	260	277	200	203	210	227	246	263	—
		194	178	169	146	121	99	79	200	191	177	152	125	102	—
		13.6	13.7	13.9	14.2	14.6	15.0	15.2	13.7	13.8	14.0	14.4	14.7	15.1	—
85	TC SHC kW	189	192	200	217	235	252	269	195	195	204	220	239	255	—
		189	176	166	143	118	97	76	195	195	174	149	123	100	—
		15.1	15.2	15.4	15.9	16.3	16.6	16.9	15.3	15.3	15.7	16.0	16.4	16.8	—
95	TC SHC kW	183	184	193	209	227	243	—	189	190	196	212	230	246	—
		183	181	162	140	115	94	—	189	190	170	146	120	97	—
		16.8	16.8	17.1	17.6	18.0	18.4	—	17.0	17.0	17.2	17.6	18.1	18.5	—
105	TC SHC kW	177	178	185	201	218	234	—	183	185	189	204	221	237	—
		177	178	159	137	112	91	—	183	185	166	143	116	94	—
		18.6	18.6	18.8	19.3	19.8	20.2	—	18.8	18.6	18.9	19.4	19.9	20.3	—
115	TC SHC kW	171	171	177	192	209	224	—	176	177	181	195	212	226	—
		171	171	154	133	109	88	—	176	177	161	139	113	90	—
		20.5	20.5	20.7	21.2	21.8	22.1	—	20.7	20.7	20.8	21.3	21.8	22.2	—
117	TC SHC kW	170	170	176	191	207	222	—	175	175	180	193	210	224	—
		170	170	154	132	108	87	—	175	175	160	138	112	90	—
		20.9	20.9	21.1	21.6	22.1	22.5	—	21.1	21.1	21.2	21.7	22.2	22.6	—
120	TC SHC kW	168	168	173	188	204	—	—	173	173	177	191	207	—	—
		168	168	152	131	107	—	—	173	173	159	137	111	—	—
		21.5	21.5	21.7	22.2	22.7	—	—	21.7	21.7	21.8	22.3	22.8	—	—

Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm													
		7000							8000						
		Evaporator Air — Ewb (F)/BF													
		54/0.58	58/0.42	62/0.29	67/0.21	72/0.20	76/0.20	80/0.05	54/0.62	58/0.48	62/0.36	67/0.23	72/0.22	76/0.21	80/0.04
75	TC SHC kW	209	209	215	232	251	268	—	216	217	221	236	255	272	—
		209	209	189	162	132	106	—	216	217	198	171	138	109	—
		13.9	13.9	14.1	14.5	14.9	15.2	—	14.1	14.1	14.2	14.5	15.0	15.3	—
85	TC SHC kW	203	204	209	224	243	260	—	211	211	215	228	247	263	—
		203	204	185	159	129	103	—	211	211	192	168	135	107	—
		15.5	15.5	15.7	16.1	16.5	16.9	—	15.7	15.7	15.8	16.2	16.6	17.0	—
95	TC SHC kW	197	197	202	216	235	251	—	204	204	209	220	238	254	—
		197	197	180	156	126	100	—	204	204	185	165	132	104	—
		17.2	17.2	17.4	17.8	18.2	18.7	—	17.4	17.4	17.6	17.9	18.3	18.7	—
105	TC SHC kW	191	191	195	208	225	241	—	197	197	202	211	228	244	—
		191	191	175	152	123	97	—	197	197	177	161	128	100	—
		19.0	19.0	19.2	19.5	20.0	20.5	—	19.2	19.2	19.3	19.6	20.1	20.6	—
115	TC SHC kW	184	184	188	199	215	230	—	190	190	194	202	218	—	—
		184	184	168	149	119	94	—	190	190	170	158	125	—	—
		21.0	21.0	21.1	21.5	22.0	22.4	—	21.1	21.1	21.2	21.6	22.1	—	—
117	TC SHC kW	183	183	187	197	214	228	—	188	188	192	200	216	—	—
		183	183	166	148	118	93	—	188	188	171	157	124	—	—
		21.3	21.4	21.5	21.8	22.4	22.7	—	21.5	21.5	21.7	22.0	22.5	—	—
120	TC SHC kW	180	180	185	194	210	—	—	186	186	190	197	—	—	—
		180	180	163	147	117	—	—	186	186	172	156	—	—	—
		21.9	22.0	22.1	22.4	23.0	—	—	22.1	22.1	22.2	22.5	—	—	—

LEGEND

BF	—	Bypass Factor
Edb	—	Entering Dry-Bulb
Ewb	—	Entering Wet-Bulb
kW	—	Compressor Motor Power Input
ldb	—	Leaving Dry-Bulb
lwb	—	Leaving Wet-Bulb
SHC	—	Sensible Heat Capacity (1000 Btuh) Gross
TC	—	Total Capacity (1000 Btuh) Gross

NOTES:

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (} h_{lwb} \text{)}$$

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{lwb} = Enthalpy of air entering evaporator coil

- The SHC is based on 80 F edb temperature of air entering evaporator coil. Below 80 F edb, subtract (corr factor x cfm) from SHC. Above 80 F edb, add (corr factor x cfm) to SHC.

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	82	83	84	85	over 85
Correction Factor						
0.05	1.04	2.07	3.11	4.14	5.18	Use formula shown below.
0.10	0.98	1.96	2.94	3.92	4.91	
0.20	0.87	1.74	2.62	3.49	4.36	
0.30	0.76	1.53	2.29	3.05	3.82	
0.40	0.65	1.31	1.96	2.62	3.27	
0.50	0.55	1.09	1.64	2.18	2.73	
0.60	0.44	0.87	1.31	1.74	2.18	
0.70	0.33	0.65	0.98	1.31	1.64	

Interpolation is permissible.
Correction Factor = $1.10 \times (1 - \text{BF}) \times (\text{edb} - 80)$.

EXPANDED PERFORMANCE DATA (COOLING) 20 Ton (Gross Capacity)

Airflow			Outdoor Ambient Temperature - Degrees F, Dry Bulb														
			75			85			95			105			115		
			Entering Indoor Air Temperature - Degrees F, Wet Bulb														
IDB	CFM (BF)		62	67	72	62	67	72	62	67	72	62	67	72	62	67	72
80	9000 (0.24)	MBU	250	267	290	243	258	281	235	249	270	228	239	260	220	229	249
		S/T	0.89	0.72	0.53	0.89	0.73	0.54	0.89	0.74	0.55	0.89	0.76	0.56	0.88	0.77	0.57
		kW	15.8	16.1	16.6	17.6	18	18.4	19.5	19.8	20.3	21.6	21.9	22.4	23.9	24.2	24.7
	8000 (0.23)	MBU	241	259	286	237	254	276	229	245	267	221	236	256	213	226	246
		S/T	0.88	0.70	0.52	0.88	0.70	0.53	0.89	0.72	0.53	0.89	0.73	0.54	0.89	0.74	0.55
		kW	15.6	15.9	16.5	17.4	17.8	18.3	19.3	19.8	20.2	21.4	21.8	22.3	23.7	24	24.6
	7000 (0.21)	MBU	238	254	281	231	250	272	223	241	262	215	232	252	207	222	242
		S/T	0.85	0.68	0.51	0.86	0.68	0.51	0.87	0.69	0.52	0.88	0.70	0.52	0.88	0.72	0.53
		kW	15.5	15.9	16.4	17.3	17.7	18.2	19.2	19.6	20.1	21.2	21.7	22.2	23.5	23.9	24.5

FORMULAS AND NOTES FOR USING EXPANDED PERFORMANCE DATA

To find leaving wet bulb and dry bulb from the expanded performance charts, use the following formulas.

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used:

$$t/db = t\ edb - \text{sensible capacity Btuh} / (1.10 \times \text{cfm})$$

$$t/wb = \text{Wet bulb temp. corresponding to enthalpy of air leaving evaporator coil (h/wb)}$$

$$h/wb = h\ ewb - \text{total capacity Btuh} / (4.5 \times \text{cfm})$$
 where h ewb = Enthalpy of air entering evap. coil
- The SHC is based on 80F edb of air entering evap coil. Below 80F edb, subtract (corr factor x cfm) from SHC. Above 80F edb, add (corr factor x cfm) to SHC.

LEGEND

MBH = Total Capacity (Gross)
 S/T = Sensible to Total Ratio
 KW = Compressor Motor Power Input.
 IDB = Indoor Dry Bulb
 edb = Entering Dry Bulb
 ewb = Entering Wet Bulb
 t/db = Leaving Dry Bulb
 t/wb = Leaving Wet Bulb
 h/wb = Enthalpy of Leaving Wet Bulb
 SHC = Sensible Heat Capacity

Bypass Factor (BF)	Entering Air Dry-Bulb (F)				
	79	78	77	76	75
	81	82	83	84	85
Correction Factor					
0.05	1.04	2.07	3.11	4.14	5.18
0.10	0.98	1.96	2.94	3.92	4.91
0.20	0.87	1.74	2.62	3.49	4.36
0.30	0.76	1.53	2.29	3.05	3.82
0.40	0.65	1.31	1.96	2.62	3.27
0.50	0.55	1.09	1.64	2.18	2.73
0.60	0.44	0.87	1.31	1.74	2.18
0.70	0.33	0.65	0.98	1.31	1.64

$$\text{Correction Factor} = 1.10 \times (1 - \text{BF}) \times (\text{edb} - 80)$$

PAS SERIES EVAPORATOR FAN PERFORMANCE

CIRCULATING BLOWER PERFORMANCE - PAS180 - Standard Motor (Belt Drive)*																				
Airflow CFM	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
4500	684	1102	791	1283	887	1466	977	1652	1061	1841	1139	2034	1214	2230	1285	2430	1353	2633	1418	2839
4800	715	1265	817	1451	910	1638	997	1828	1078	2021	1155	2217	1228	2417	1297	2619	1364	2825	1428	3033
5100	747	1442	844	1633	934	1825	1018	2019	1097	2216	1171	2416	1243	2618	1311	2823	1376	3031	1439	3242
5400	779	1635	872	1831	959	2027	1040	2226	1117	2426	1189	2629	1259	2835	1326	3043	1390	3254	1452	3467
5700	812	1844	901	2044	985	2245	1063	2448	1138	2652	1209	2858	1277	3067	1342	3278	1405	3492	1466	3708
6000	845	2068	931	2273	1011	2478	1087	2685	1160	2893	1229	3103	1295	3316	1359	3530	1421	3746	-	-
6300	878	2309	961	2518	1039	2728	1112	2939	1183	3151	1250	3365	1215	3580	-	-	-	-	-	-
6600	912	2566	992	2780	1067	2994	1138	3209	1207	3425	1273	3642	-	-	-	-	-	-	-	-
6900	946	2841	1023	3059	1096	3277	1165	3496	1232	3716	-	-	-	-	-	-	-	-	-	-
7200	981	3133	1055	3355	1125	3578	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7500	1016	3443	1087	3669	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEGEND

Watts = Input Watts to motor. Airflow based on dry coil with filters.

Airflow based on dry coil with filters. Standard low-medium static drive range is 891 to 1179 rpm (for 208/230, 380 and 460v units) or 1159 to 1429 rpm (for 575-vunits). Alternate high-static drive range is 1227 to 1559 (for 208/230, 380, and 460v units).

CIRCULATING BLOWER PERFORMANCE - PAS210/240 - Standard Motor (Belt Drive)*																				
Airflow CFM	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
5500	682	1675	760	1922	832	2177	901	2441	965	2712	1027	2990	1086	3275	1142	3567	1197	3864	1249	4167
6000	730	2005	802	2257	871	2516	935	2783	997	3057	1056	3337	1112	3623	1167	3915	1219	4213	1270	4516
6500	778	2373	846	2630	911	2893	972	3164	1031	3440	1087	3722	1142	4010	1194	4304	1245	4602	1294	4906
7000	828	2780	892	3042	953	3310	1011	3583	1067	3863	1121	4148	1173	4438	1224	4733	1273	5033	1320	5337
7500	878	3227	938	3494	996	3766	1051	4043	1105	4326	1156	4613	1207	4906	1255	5203	1302	5504	1348	5810
8000	928	3715	985	3986	1040	4263	1093	4544	1144	4830	1194	5120	1242	5415	1289	5714	1334	6018	1379	6325
8500	979	4245	1033	4521	1085	4801	1136	5086	1185	5375	1232	5669	1279	5966	1324	6268	1368	6573	1411	6883
9000	1030	4817	1082	5098	1131	5382	1180	5671	1227	5964	1272	6260	1317	6561	1360	6865	1403	7173	1445	7484
9500	1082	5433	1131	5718	1178	6007	1225	6299	1270	6595	1313	6895	1356	7198	138	7505	1440	7815	1480	8129
10,000	1134	6093	1180	6382	1226	6675	1270	6971	1313	7271	1356	7574	1397	7881	1438	8190	1477	8503	-	-

LEGEND

Watts = Input Watts to motor.

Airflow based on dry coil with filters. Standard low-medium static drive range for the PAS210 is 910 to 1095 rpm. Standard low-medium static drive range for the PAS240 size is 1002 to 1225 rpm. Alternate high-static drive range for the PAS210 size is 1069 to 1287. Alternate high-static drive range for the PAS240 size is 1193 to 1458 rpm. Other rpms require a field-supplied drive.

EVAPORATOR FAN DATA FOR PAS180, 210, 240

EVAPORATOR FAN MOTOR DATA FOR PAS180, 210, 240

UNIT	Unit Voltage	Maximum Acceptable Continuous BHP	Maximum Acceptable Operating Watts	Maximum Amp Draw
PAS180	208/230	4.25	3,775	10.5
	460	4.25	3,775	4.8
	575	3.45	3,065	3.9
PAS210	208/230	5.90	5,180	15.8
	460	5.90	5,180	7.9
	575	5.90	5,180	6.0
PAS240	208/230	8.70	7,915	22.0
	460	9.50	8,640	13.0
	575	8.70	7,915	10.0

FAN RPM AT MOTOR PULLEY SETTINGS FOR PAS180, 210, 240

UNIT	MOTOR PULLEY TURNS OPEN*										
	1	1- 1/2	2	2- 1/2	3	3- 1/2	4	4- 1/2	5	5- 1/2	6
PAS180H,L	1179	1150	1121	1093	1064	1035	1006	978	949	920	891
PAS180S	1429	1403	1376	1349	1323	1296	1269	1242	1215	1188	1159
PAS210H,L,S	1095	1077	1058	1040	1021	1002	984	965	947	928	910
PAS240H,L,S	1225	1209	1187	1165	1143	1120	1098	1076	1053	1031	1002

* Due to belt and pulley size, pulley cannot be set to 0 or 1/2.

AIR QUANTITY LIMITS FOR PAS180, 210, 240

UNIT	Minimum Airflow (Cfm)	Maximum Airflow (Cfm)
PAS180	4500	7500
PAS210	5400	9000
PAS240	7000	10,000

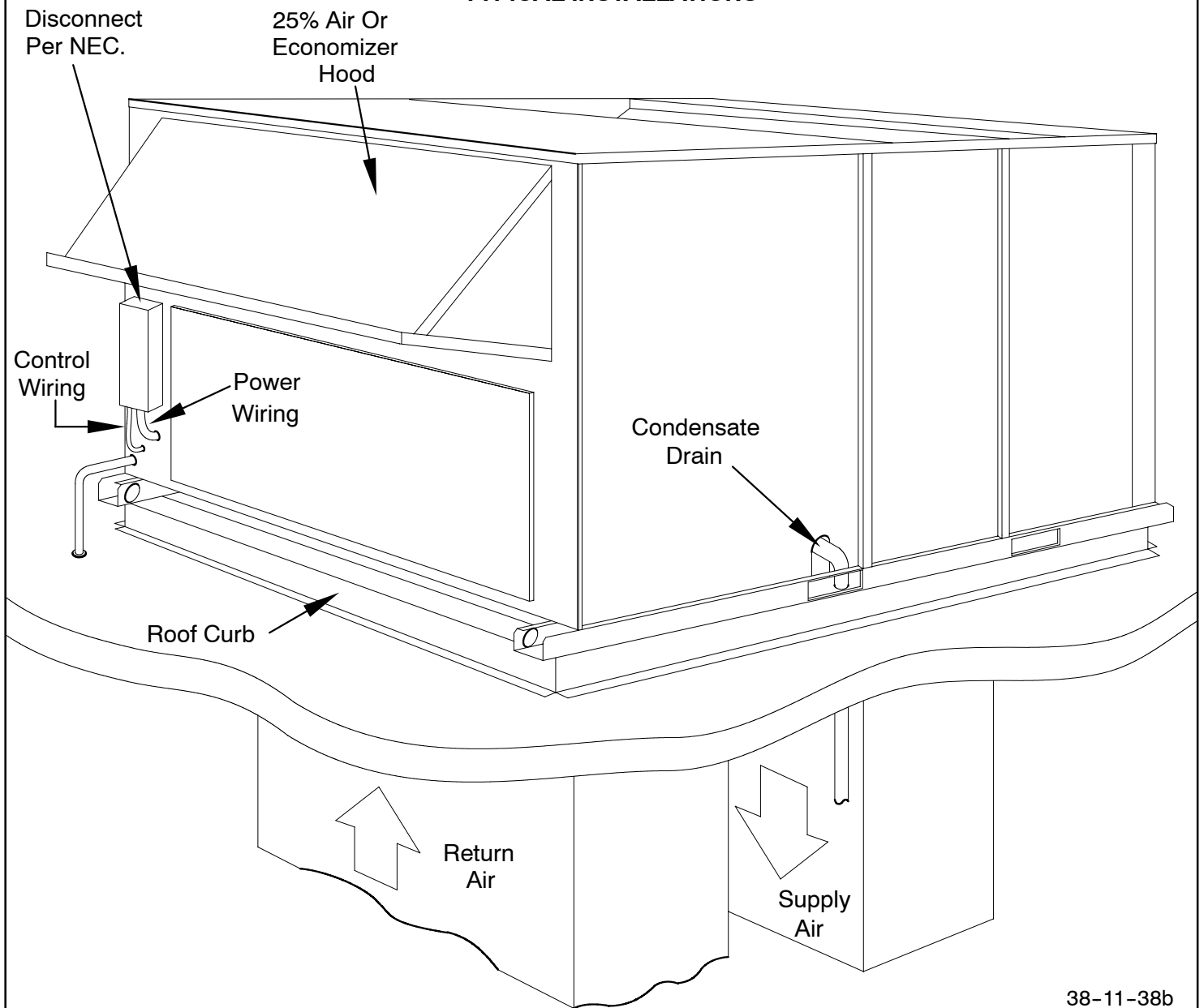
EVAPORATOR FAN MOTOR EFFICIENCY

UNIT PAS	Motor Efficiency %
180	85.8
180 (575)	81.7
210	87.5
240	88.5

OUTDOOR SOUND POWER

UNIT	SOUND RATING (dB)	OCTAVE BANDS							
		63	125	250	500	1000	2000	4000	8000
PAS180	88 Bels	90.8	88.7	86.4	84.3	83.5	78.4	75.6	66.8
PAS210	88 Bels	90.8	88.7	86.4	84.3	83.5	78.4	75.6	66.8
PAS240	94 Bels	98.7	92.3	93.8	90.9	89.6	85.9	80.3	74.3

TYPICAL INSTALLATIONS



38-11-38b

PAS Series ELECTRICAL DATA - ELECTRIC HEAT ACCESSORY

Unit Voltage	Qty	Model Number	Evap. Fan Motor		Electric Heater *		Power Supply	
			HP	FLA	kW	FLA	MCA	MOCP **
PAS180 208-3-60	1	AES034EHA	3.7	10.5	26.0	71	102	110
	1	AES056EHA			42.0	117	159	175
	1	AES075EHA			56.0	156	169	200
PAS180 240-3-60	1	AES034EHA		11.0	34.0	82	116	125
	1	AES056EHA			56.0	135	149	175
	1	AES075EHA			75.0	180	194	225
PAS180 480-3-60	1	AES132ELA		4.8	32.0	39	55	60
	1	AES055ELA			55.0	66	72	80
	1	AES080ELA			80.0	96	102	110
PAS210 208-3-60	1	AES034EHA	5.0	15.8	26.0	71	110	110
	1	AES056EHA			42.0	117	166	175
	1	AES075EHA			56.0	156	176	200
PAS210 240-3-60	1	AES034EHA		15.8	34.0	82	122	125
	1	AES056EHA			56.0	135	155	175
	1	AES075EHA			75.0	180	200	225
PAS210 480-3-60	1	AES132ELA		7.9	32.0	39	59	60
	1	AES055ELA			55.0	66	76	80
	1	AES080ELA			80.0	96	106	110
PAS240 208-3-60	1	AES034EHA	7.5	25.0	26.0	71	120	150
	1	AES056EHA			42.0	117	178	200
	1	AES075EHA			56.0	156	187	200
PAS240 240-3-60	1	AES034EHA		25.0	34.0	82	134	150
	1	AES056EHA			56.0	135	166	175
	1	AES075EHA			75.0	180	211	225
PAS240 480-3-60	1	AES132ELA		13.0	32.0	39	65	70
	1	AES055ELA			55.0	66	82	90
	1	AES080ELA			80.0	96	112	125

* Heater capacity (kW) is based on heater voltage of 208 v, 240 v, 480 v, and 600 v. Heaters are rated at 240 v, 480 v, or 600 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly. To determine heater capacity at actual unit voltage, multiply 240v, 480v, and 600v capacity by multipliers found at bottom of page.

** Fuse or HACR circuit breaker.

MULTIPLICATION FACTORS

Heater Rating Voltage	ACTUAL HEATER VOLTAGE									
	208	230	240	380	440	460	480	550	575	600
240	0.751	0.918	1.000							
480				0.626	0.840	0.918	1.000			
600								0.915	1.000	1.089

NOTE: The following equation converts kW of heat energy to Btuh: kW x 3.412 = Btuh.

LEGEND

FLA - Full Load Amps

MCA - Minimum Circuit Amps

MOCP - Maximum Overcurrent Protection

LRA - Locked Rotor Amps

NEC - National Electrical Code

NOTES

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.

2. Unbalanced 3-Phase Supply Voltage - Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

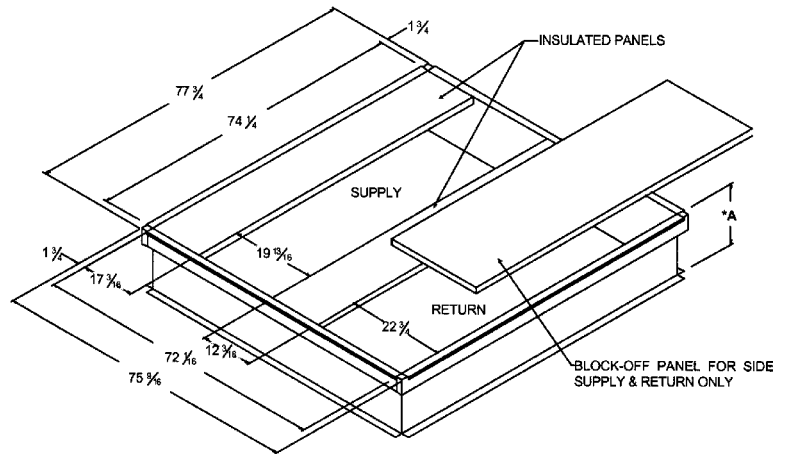
% Voltage Imbalance = $100 \times (\text{max voltage deviation from average voltage} / \text{average voltage})$

IMPORTANT: If the supply voltage phase imbalance is more than 2 %, contact your local electric company immediately.

ACCESSORIES

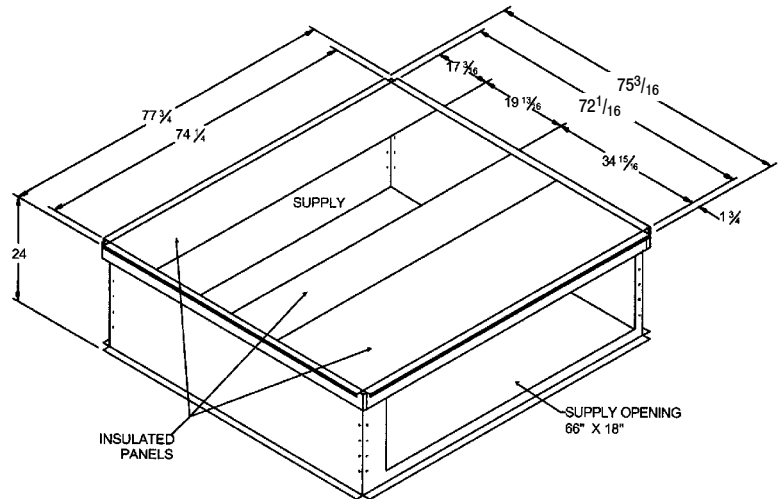
VERTICAL DISCHARGE ROOF CURBS

Description	Model Number	Where Used
14" High	AXB060CMA	180, 210, 240
24" High	AXB060CHA	180, 210, 240



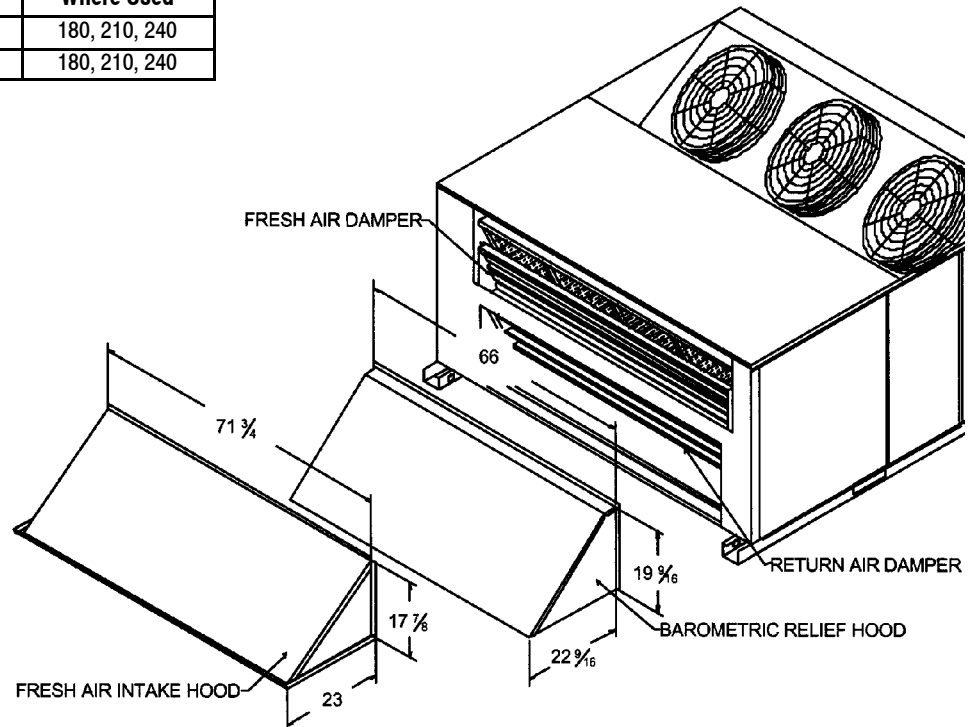
HORIZONTAL DISCHARGE ROOF CURBS

Description	Model Number	Where Used
24" High	AXB065CHA	180, 210, 240
24" High w/ Duct	AXB165CHA	180, 210, 240



ECONOMIZER - HORIZONTAL / DOWNFLOW

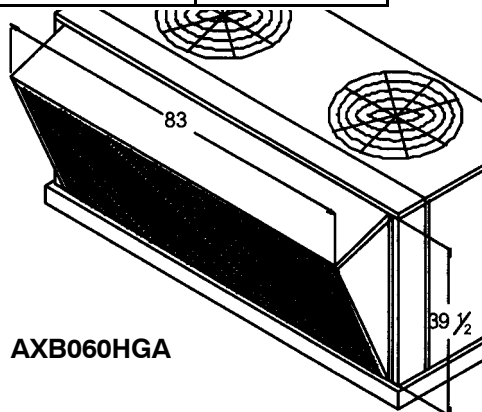
Description	Model Number	Where Used
Fully Modulating	AXB060EMA	180, 210, 240
Three Position	AXB060EPA	180, 210, 240



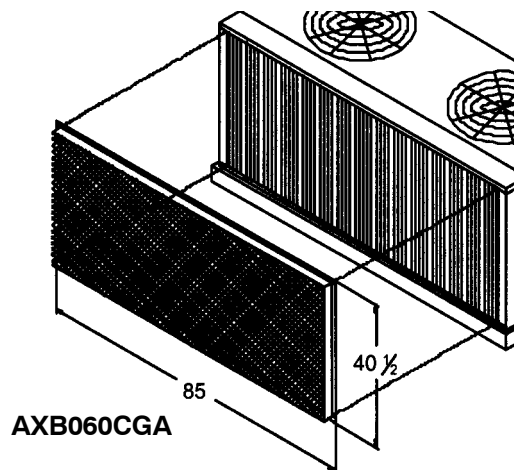
ACCESSORIES (CONT.)

COIL PROTECTION

Description	Model Number	Where Used
Coil Guard	AXB060CGA	180, 210, 240
Hail Guard	AXB060HGA	180, 210, 240



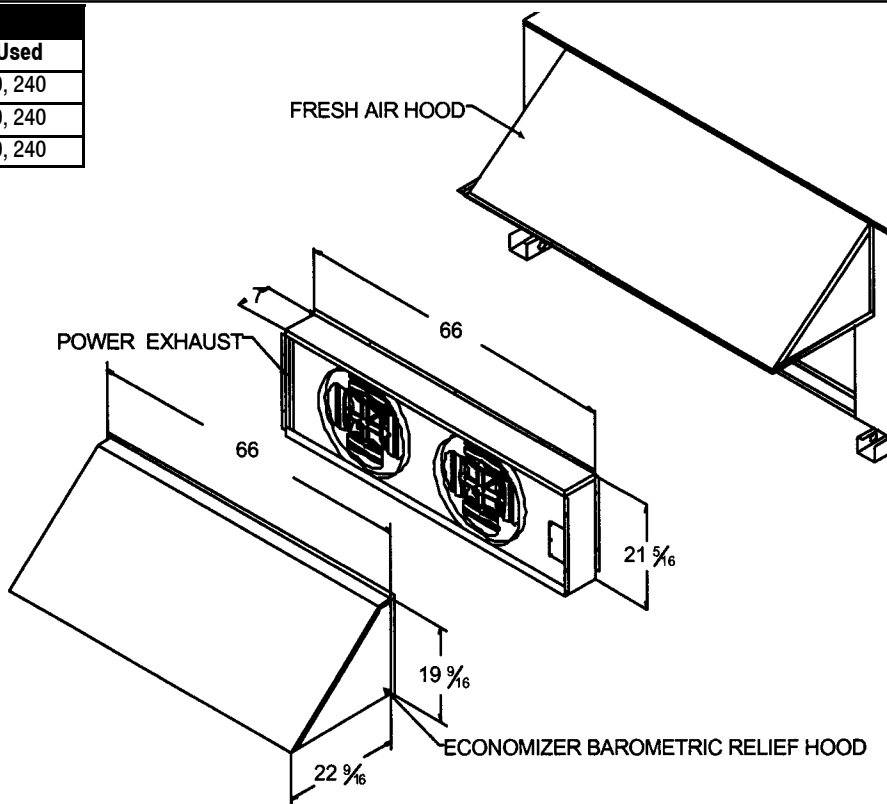
AXB060HGA



AXB060CGA

POWER EXHAUST

Description	Model Number	Where Used
208/230 Volt	AXB060PEH	180, 210, 240
460 Volt	AXB060PEL	180, 210, 240
575 Volt	AXB060PES	180, 210, 240



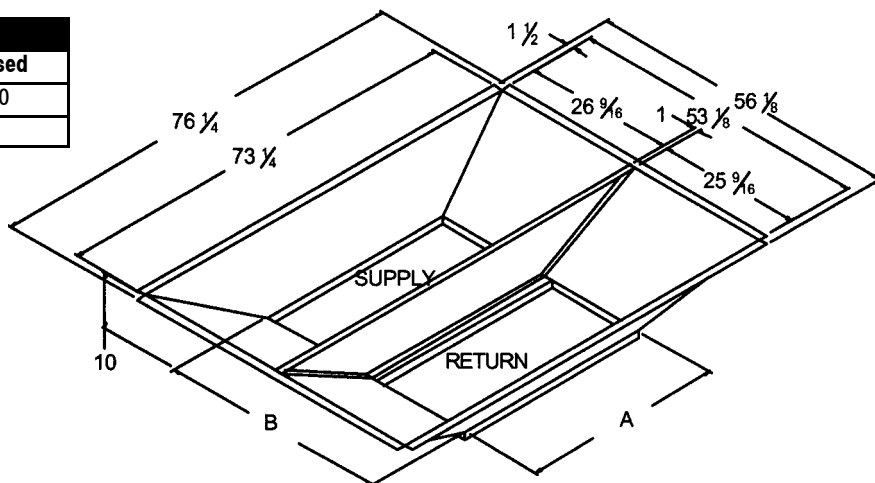
POWER EXHAUST PERFORMANCE DATA

Model	Volt/Phase/ Hertz	Motor			Unit					
		Qty	HP	RPM	Cir. Qty	LRA	FLA	MCA	Fuse Size	@0.1 CFM
AXB060PEH	208-230/3/60	2	3/4	1075	1	24.9	10.0	12.6	15	9,600
AXB060PEL	460/3/60	2	3/4	1075	1	N/A	4.4	5.6	8	9,600
AXB060PES	575/3/60	2	3/4	1050	1	N/A	3.0	3.8	5	9,600

ACCESSORIES (CONT.)

CONCENTRIC DUCT KIT

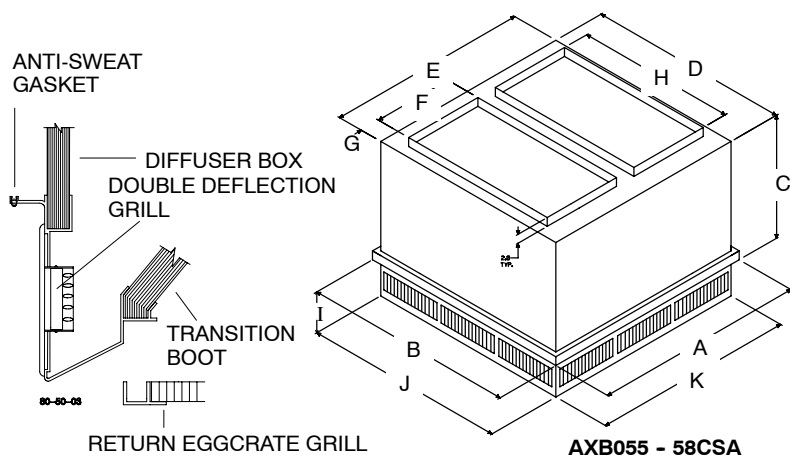
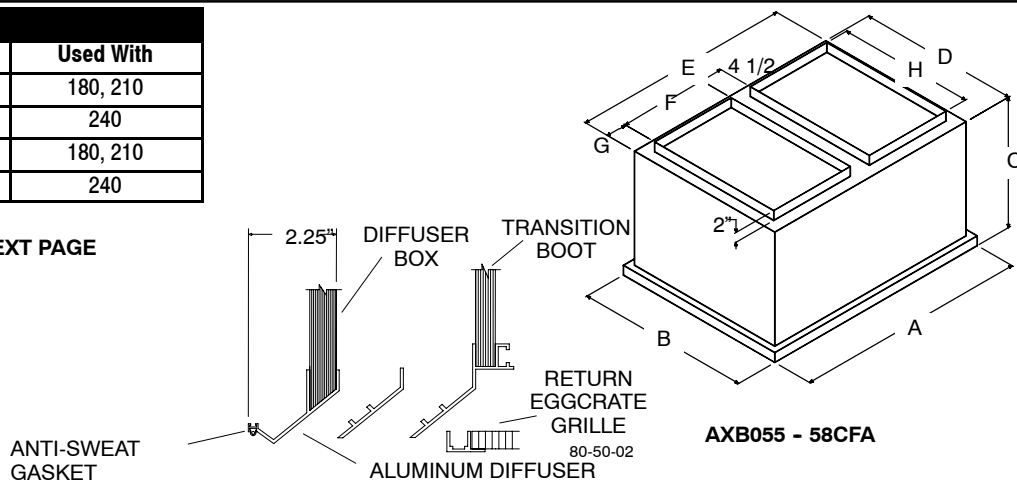
Description	Model Number	Where Used
18" x 36"	AXB160CTA	180, 210
24" x 48"	AXB260CTA	240



CONCENTRIC DIFFUSER

Description	Model Number	Used With
Flush Mount	AXB055CFA	180, 210
Flush Mount	AXB058CFA	240
Step Down	AXB055CSA	180, 210
Step Down	AXB058CSA	240

SEE PERFORMANCE DATA ON NEXT PAGE



DIMENSIONS

Model Number	A	B	C	D	E	F	G	H	I	J	K	Duct Size
AXB055CFA	47-5/8	47-5/8	29-1/4	45	45	18	2-1/4	38	N/A	N/A	N/A	18 x 36
AXB058CFA	59-5/8	59-5/8	35-1/4	57	57	24	2-1/4	48	N/A	N/A	N/A	24 x 48
AXB055CSA	47-5/8	47-5/8	24-5/8	45	45	18	2-1/2	36	10-1/8	45-1/2	45-1/2	18 x 36
AXB058CSA	59-5/8	59-5/8	30-5/8	57-1/2	57-1/2	24	2-1/2	48	11-1/8	57-1/2	57-1/2	24 x 48

ACCESSORIES (CONT.)

CFA SERIES PERFORMANCE DATA

Part No. AXB	CFM	Static Pressure In. WC	Throw Feet	Neck Velocity FPM	Jet Velocity FPM	db Sound Level
055CFA	5600	.36	28-37	1000	2082	45
	5800	.39	29-38	1036	2156	45
	6000	.42	40-50	1071	2230	45
	6200	.46	42-51	1107	2308	50
	6400	.50	43-52	1143	2379	50
	6600	.54	45-56	1179	2454	50
058CFA	7200	.39	26-35	996	2093	45
	7400	.41	28-37	1024	2151	45
	7600	.43	29-38	1051	2209	45
	7800	.47	40-50	1079	2276	45
	8000	.50	42-51	1107	2326	50
	8200	.53	43-52	1134	2384	50

CSA SERIES PERFORMANCE DATA

Part No. AXB	CFM	Static Pressure In. WC	Throw Feet	Neck / Jet Velocity FPM	db Sound Levels
055CSA	5600	.36	39-49	920	30
	5800	.39	42-51	954	30
	6000	.42	44-54	1022	30
	6200	.46	45-55	1056	30
	6400	.50	46-55	1090	30
	6600	.54	47-56	1124	30
058CSA	7200	.39	33-38	827	25
	7400	.41	35-40	850	25
	7600	.43	36-41	873	25
	7800	.47	38-43	896	30
	8000	.50	39-44	918	30
	8200	.53	41-46	941	30

CSA/CFA NOTES:

1. All data is based on the Air Diffusion Council guidelines.
2. Throw data is based on Terminal Velocities of 75 FPM using isothermal air.
3. Throw is based on diffuser blades being directed in a straight pattern.
4. Actual sound levels are less than those shown.
5. Minimum height 9' above floor.

FRESH AIR DAMPERS

Description	Model Number	Used With
35% Motorized	AXB060FMA	180, 210, 240

7 DAY PROGRAMMABLE COMMERCIAL THERMOSTAT

Model Number	Used With
1170830	180, 210, 240

LOW AMBIENT KIT

Model Number	Used With
AXB160LAA	180, 210
AXB260LAA	240

PART NUMBERS FOR APPROVED HIGH STATIC CONVERSIONS*

Unit Size (Tons)	Voltage	Motor	Motor Pulley	Blower Pulley	Belt	Circuit Breaker	Circuit Breaker Bracket
15 & 17-1/2	208/230 & 460	No Change	1170553	1171427	No Change	N/A	N/A
15	575	N/A	N/A	N/A	N/A	N/A	N/A
20	All Voltages	No Change	1171414	1170569	1171528	N/A	N/A

* Available thru service parts only.

OPERATING SEQUENCE

Cooling, Units Without Economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC) and compressor contactor no. 1 (C1) are energized, and evaporator-fan motor (IFM), compressor no. 1, and condenser fan(s) start. The condenser fan motor(s) runs continuously while unit is cooling. When the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

Heating, Units Without Economizer - If Accessory or Optional Heater is Installed) — Upon a call for heating through terminal W1, IFC and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed, HC2 is energized through W2.

APPLICATION DATA

1. **DUCTWORK** — Ductwork should be attached to the curb on all units. Interior installation may proceed before unit is set in place on roof. If ductwork will be attached to the unit, do not drill in condensate drain pan area — leaks may result. See figures below for information on field-installed concentric ductwork when applicable.
2. **THRU-THE-CURB SERVICE CONNECTIONS** — Roof curb connections allow field power wires, control wires, and gas supply to enter through the roof curb opening.
3. **THERMOSTAT** - Use of 2-stage cooling thermostat is recommended for all units. A 2-stage cooling thermostat is required on units with accessory economizer to provide integrated cooling.
4. **HEATING-TO-COOLING CHANGEOVER** — All units are automatic changeover from heating to cooling when automatic changeover thermostat and subbase are used.
5. **AIRFLOW** — Units are draw-thru on cooling and blow-thru on heating.
6. **MAXIMUM AIRFLOW** - To minimize the possibility of condensate blow-off from evaporator, airflow through units should not exceed 500 cfm/nominal ton on size 180-240 units.
7. **MINIMUM AIRFLOW** — The minimum airflow for cooling is 300 cfm/nominal ton on size 180-240 units.
8. **MINIMUM AMBIENT COOLING OPERATION TEMPERATURE** - Units are designed to operate at outdoor temperatures down to 40 F. To operate at lower outdoor-air temperatures, see Trade Prices or contact your local representative for appropriate accessory combinations for specific applications.
9. **MAXIMUM OPERATING OUTDOOR-AIR TEMPERATURE** - For cooling, this temperature is 120 F for 180, 125 F for 240 size, and 121 F for 300 size. Refer to Cooling Capacities tables on pages 20 and 21 for further details.
10. **INTERNAL UNIT DESIGN** — Due to the internal unit design (draw-thru over the motor), air path, and specially designed motors, the full horsepower (maximum continuous bhp) listed in the Physical Data table and the notes following each Fan Performance table can be utilized with extreme confidence. Using motors with the values listed in the Physical and Fan Performance Data tables will not result in nuisance tripping or premature motor failure. The unit warranty will not be affected.

GUIDE SPECIFICATIONS: PAS180 - 240

CABINET:

The cabinet shall be made of sturdy baked enamel coated galvanized steel. Base rails shall be 16 gauge steel and have fork lift slots and holes provided for lifting shackles. Unit shall be designed with convertible airflow and shipped ready for downflow applications with conversion to horizontal air flow accomplished by relocating two panels.

Return air compartments shall be insulated with not less than 1/2" of water resistant coated glass fiber and not less than 1/2" of aluminum foil faced glass fiber in the furnace/supply compartments.

COOLING SECTION:

Units shall be factory charged and operationally ready. Each refrigeration circuit shall have a compressor, with internal overload protection, high and low pressure switches, filter drier and copper tube/aluminum fin evaporator and condenser coils.

Units shall be capable of cooling operation down to 25°F as shipped from the factory.

COILS:

The evaporator and condenser coils shall be fabricated with aluminum fins mechanically bonded to copper tubing. Both coils shall be pressure tested prior to assembly into the unit and electronically leak tested after assembly onto the unit. The evaporator coil shall be protected from dust and debris on the return air side by factory installed 2" air filters.

CONDENSER FAN:

The unit shall have a single direct drive propeller fan/motor assembly mounted directly to a vertical-discharge grille panel that is easily removable. Motors shall have permanently lubricated sleeve bearings and inherent overload protection.

EVAPORATOR BLOWER:

The units shall have a single belt driven evaporator blower. The motor shall have permanently lubricated ball bearings and internal overload protection. An adjustable motor drive sheave for matching air flow requirements shall be standard. Additionally high static accessory kits shall be available for air flows above the standard requirement.